

## CLAIMS

1. A liquid ejection head, comprising:
  - a pressure generating portion, provided in an ink channel communicating a common ink chamber and a nozzle orifice;
  - a vibration plate, which defines a part of the pressure generating portion, so that liquid in the pressure generating portion is ejected from the nozzle orifice as a liquid droplet by deforming the vibration plate;
  - a piezoelectric vibrator, provided on a surface of the vibration plate which is opposite to a surface facing the pressure generating portion; and
  - a liquid supply port, arranged between the common ink chamber and the pressure generating portion to serve as an orifice,
- wherein the piezoelectric vibrator has a multilayer structure which comprises:
  - an upper piezoelectric layer and a lower piezoelectric layer, laminated one on another;
  - a drive electrode, formed at a boundary between the upper piezoelectric layer and the lower piezoelectric layer, and electrically connected to a supply source of a drive signal;
  - an upper common electrode, formed on a surface of the upper piezoelectric layer; and
  - a lower common electrode, formed on a surface of the lower piezoelectric layer; and
- wherein an inertance of the nozzle orifice and an inertance of the liquid supply port are greater than an inertance of the pressure generating

24 portion.

1 2. The liquid ejection head as set forth in claim 1, wherein a thickness of  
2 the upper piezoelectric layer and a thickness of the lower piezoelectric layer  
3 are set to 10  $\mu\text{m}$  or less.

1 3. The liquid ejection head as set forth in claim 1 or 2, wherein the  
2 inertance of the nozzle orifice and the inertance of the liquid supply port are  
3 each set so as to be more than double the inertance of the pressure  
4 generating portion.

1 4. The liquid ejection head as set forth in any one of claims 1 to 3,  
2 wherein the pressure generating portion comprises:

3 a rectangular-parallelepiped pressure chamber, a volume of which is  
4 varied by the deformation of the elastic plate which defines one face of the  
5 pressure chamber;

6 a nozzle communication port, communicating one end of the pressure  
7 chamber and the nozzle orifice; and

8 a supply-side communication port, communicating another end of the  
9 pressure chamber and the liquid supply port; and

10 wherein a length of the pressure chamber is set to 1.1 mm or less.

1 5. The liquid ejection head as set forth in any one of claims 1 to 4,  
2 wherein an amount of deformation of the piezoelectric vibrator is set to a value  
3 of 0.16  $\mu\text{m}$  or more.

1        6.        The liquid ejection head as set forth in any one of claims 1 to 5,  
2        wherein a compliance of the piezoelectric vibrator is set to a compliance of the  
3        liquid or less.

1        7.        The liquid ejection head as set forth in any one of claims 1 to 6,  
2        wherein a volume of the liquid droplet ejected from the nozzle orifice is set to 6  
3        pL or more, and an ejection frequency of the liquid droplet is set to 50 kHz or  
4        higher.

1        8.        The liquid ejection head as set forth in any one of claims 1 to 6,  
2        wherein a volume of the liquid droplet ejected from the nozzle orifice is set to 3  
3        pL or less, and an ejection frequency of the liquid droplet is set to 30 kHz or  
4        higher.

1        9.        The liquid ejection head as set forth in any one of claims 1 to 8,  
2        wherein a natural period of the pressure generating portion is set to 7  $\mu$ s or  
3        less.